

Assessing the Effects of Entrainment Risk, Reproductive Biology, Larval Feeding and Population Structure on Delta Smelt Recovery

Gonzalo C Castillo

Public Comments

No public comments were received for this proposal.

Collaboration Panel Review

Proposal Title

#0156: Assessing the Effects of Entrainment Risk, Reproductive Biology, Larval Feeding and Population Structure on Delta Smelt Recovery

| Final Panel Rating |
|--------------------|
| adequate |

Collaboration Panel (Primary) Review

Collaboration:

Will the results of the collaborative effort be greater than the sum of its parts? Is it clear why the subprojects are part of a larger collaborative proposal rather than several independent smaller ones?

adequate

The project has four major components: 1) population losses; 2) reproductive biology; 3) larval feeding; and 4) population structure. Although all the components revolve around Delta smelt issues, the proposal does not articulate how they benefit from being bundled together. The tasks fit together from different institutions, but they dont appear to inter-relate with eachother.

Interdependence And Integration:

Does the proposal have an example that clearly articulates the conceptual model of each subproject and how they link together as a whole? Are the boundaries of the study plans focused and cohesive, yet well delineated? Is there a plan for potential differences in the stages of subproject completion times? Are there clear plans for analyses and interpretations which seek to identify and quantify relationships among the data collected in various subprojects rather than separate analyses for each subproject?

adequate

There is one conceptual model that demonstrates some of the linkages between the subprojects, but these linkages are not clearly described in the model, nor in the text of the

#0156: Assessing the Effects of Entrainment Risk, Reproductive Biology, Larva...

Collaboration Panel Review

proposal. The subprojects are most clearly linked to a central goal to improve prediction of population response to environmental and management actions. In addition, the relationship between goals and objectives, hypotheses, and tasks is not clearly articulated in the proposal. There is not a plan for potential differences in the stages of the subproject completion times. Although given that the subprojects do not seem to be linked, there does not seem to be a need for this type of plan. There is not a clear plan for analysis across various subprojects.

Project Management:

Is it clear who will be performing management tasks and administration of the project? Are there resources set aside for project management and time given for investigators to collaborate? Is there a process for making decisions during the course of the project? Are there acknowledgments of potential barriers to collaboration and explanations of how team members will overcome barriers particular to their institutions?

above average

It is clear who will be performing management tasks and administration of the proposal. There is a specific task (5) devoted to project management and coordination. There is little discussion, however, in the proposal on how synthesis is expected to occur and no discussion of decision-making, potential barriers to collaboration, etc.

Team Composition:

Does the lead principal investigator have successful management history and experience leading collaborative teams? Is it clear that all key personnel are committed to making significant contributions to the project? Do team members have complementary skills?

adequate

It does not appear based on the CV provided that the lead PI has experience leading collaborative teams. Under project feasibility (p.19), the proposal describes in some detail how the team's skills are complementary. Given that personnel are assigned to all major tasks, it appears as if the key personnel are committed to making significant contributions to the project.

Collaboration Panel Review

Communication Of Results:

Is there a clear plan for comprehensive and cohesive reporting of project progress to the CALFED community?

above average

On page 18 of the proposal, there is a discussion of dissemination of results. The project proponents have outlined a plan to disseminate results through a range of mechanisms, including CALFED Science Conferences, other national conferences, peer-reviewed journals, reports to the Science Program, IEP oversight groups, summaries in IEP newsletter, oral presentations to Delta Smelt Working Group, etc,

Additional Comments:

Collaboration Panel (Discussion) Review

Primary reviewer judged the overall proposal as adequate, with the outreach and communication effort description as above average. The secondary reviewer agreed overall, and gave a slightly higher final rating.

Technical Synthesis Panel Review

Proposal Title

#0156: Assessing the Effects of Entrainment Risk, Reproductive Biology, Larval Feeding and Population Structure on Delta Smelt Recovery

| Final Panel Rating |
|--------------------|
| adequate |

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

This proposal outlines the judicious need for information on reproductive biology, larval feeding ecology and population structure on the federally threatened delta smelt. Currently, information on the delta smelt is lacking, hindering scientifically-based species management. The goals and objectives clarify the need for this study and management relevancy of research findings. The conceptual model conveys the complexity of factors and relationships influencing delta smelt populations. However, based on this proposal, it is unclear if the information gained will represent the real-world complexity and allow for reintegration of individual elements to help agency managers fulfill management objectives. Reproductive patterns, larval feeding environment, and population structure and losses could each be major research projects in and of themselves. Perhaps it would be more meaningful to comprehensively design and research one of these areas with a well thought out experimental design rather than conducting a partial analysis of multiple factors/issues that have limited management and field value. The investigators are well qualified to accomplish project goals and objectives. Publication(s) and presentation(s) of scientific findings would likely result from this study. However, the utility and quality of information gained will be

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limited.

Additional Comments:

The following is a summary of the three technical reviewers comments: The P.I.'s are excellent and have a superior understanding of the issues at hand. However, their understanding is not adequately conveyed in the proposal. The project appears poorly integrated and needing cohesion (e.g., modeling component). Could be easily improved if methods were revised or individual projects for each issue might be a better approach.

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Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

Assessing the effects of entrainment risk, reproductive biology, and larval feeding and population structure on Delta smelt recovery

The panel recognized that the proposed work addresses an important species. It includes a good study technique of releasing marked larvae to track potential entrainment. However, the investigators propose to use two chemical markers that are not FDA approved. The panel indicated that the approval process is long and could introduce problems with implementation of the study. The panel expressed additional concern regarding a lack of adequate integration between seemingly disparate tasks. It was also determined that studies on larval feeding and reproductive biology were inadequately justified and designed.

Final Ranking: Adequate

Technical Review #1

proposal title: Assessing the Effects of Entrainment Risk, Reproductive Biology, Larval Feeding and Population Structure on Delta Smelt Recovery

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

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| Comments | The goals and objectives are clearly stated. The project is timely in terms of mangement needs and important products could result from this work. There are many topics addressed in this proposal that will provide results that are badly needed by managers to improve the basis for the management of delta smelt. Especially high on the list is the work on entrainment of Delta smelt. I like the approaches proposed especially with the larval mark-recapture work and the selection studies. |
| Rating | very good |

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

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| Comments | The study is reasonably well justified relative to the exisiting knowledge and the conceptual model is fairly well stated. The conceptual model is adequate for the proposed study but may not cover all the possibilities that can influnce Delta smelt population levels. |
| Rating | good |

Technical Review #1

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

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| Comments | I like the approaches proposed for the field entrainment studies especially with the larval mark-recapture work and the selection studies. I would like to be supportive of all of the proposed work, but I see a number of potential problems and limitations with the larval feeding studies. I think doing some additional basic feeding studies with Delta smelt is a good idea but not with the methods as outlined. Some of the methods as outline are questionable. They have used similar methods to study the effects of food concentration in the past and they need to stop repeating experimental methods that limit the utility of the results. Feeding experiments in small containers (2 l containers were used in previous studies with high stocking densities) are a poor indicator of the precise conditions for larval feeding, especially when conducting them at a broad range of food densities and at high larval stocking densities such as are proposed here. You will always see a food density effect as the studies are designed but you are not estimating prey density requirements! Secondly, larval feeding is likely to be greatly affected by the type of prey and yet they propose to use Artemia and rotifers to look at feeding responses and food density affects for Delta smelt. Even if you can't conduct all the experiment with copepods or a mixture of wild live zooplankton, they need to do at least enough experiments to determine what the differences are likely to be. It seems the issue of different types of |
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Technical Review #1

copepods (native and exotic) in the delta, changes in their abundance and the effects on larval feeding is a bigger question mark than turbulence for delta smelt. After all turbulence hasn't changed in the Delta has it? Sure it's a variable that may need to be accounted for in models of feeding, but I suspect that smelt show the same functional response as other larvae for turbulence but perhaps with a slightly higher tolerance for turbulence because of their nursery habitat. Isn't there some way to do a series of studies with the native zooplankton comparing type of prey for example that are natural prey available in the Delta. I know it's a lot more work but of much higher value to managers because it addresses the issues of changes in the delta that may be affecting population levels of smelt. Also if you conduct turbulence studies at just 2 levels (high and low) it doesn't give you a functional response to work with. They need to work with a range of turbulence intensities that are representative of condition in the Delta. If they are going to do the work to estimate reactive distances, swimming speed and such I suggest they think about a shadowgraph as opposed to simple video. The results will be much more precise with a shadowgraph and probably easier to analyze. The other component of this work I have reservations about is the mating and hybridization studies. For the mating studies I am uncomfortable with result from the lab that may be extrapolated to the field. Pairing different species in the lab in very small numbers is very different from what probably goes on in the field. Natural hybridization may occur in the field not because males actively participate in spawning with a related species but because both species utilize the same habitat for

Technical Review #1

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| | spawning and sperm released from one species fertilizes the other. The other potential problem is the quality and condition of the males can affect the results but that is a minor consideration. |
| Rating | fair |

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?
Is the scale of the project consistent with the objectives and within the grasp of authors?

| | |
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| Comments | See discussion in the approach section. |
| Rating | good |

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

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| Comments | |
| Rating | not applicable |

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

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| Comments | See potential limitation discussed under approach. |
| Rating | good |

Additional Comments

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| Comments |
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Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

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| Comments | All of the investigators involved in this proposal are highly qualified to conduct this research. |
| Rating | very good |

Budget

Is the budget reasonable and adequate for the work proposed?

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| Comments | The budget is high (1.9M), especially given that much of the work is in the lab, but it is a very large cast. It is difficult to understand the precise role of everyone listed as a participant in this project. |
| Rating | good |

Overall

Provide a brief explanation of your summary rating.

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| Comments | This could easily be rated a very good proposal if the methods were revised for the larval rearing and if the mating studies were either omitted or better justified. |
| Rating | good |

Technical Review #2

proposal title: Assessing the Effects of Entrainment Risk, Reproductive Biology, Larval Feeding and Population Structure on Delta Smelt Recovery

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

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| Comments | The goals and objective are clear and relate to an overall conceptual model of the species and its environment. Well considered null hypotheses are presented within each of four main tasks. As the Delta smelt is a listed species, the information sought is timely and important. |
| Rating | excellent |

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

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| Comments | The summary of existing knowledge on delta smelt and related species is adequate and related to a conceptual model that identifies critical information needs for the conservation and management of Delta smelt. Both pilot and full-scale tasks are described, and they are based on an understanding of previous work and specified information needs. |
| Rating | excellent |

Technical Review #2

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

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| Comments | The approach is multidisciplinary and thoroughly addresses key questions to advance knowledge in critical areas. Methods are described in a well organized manner with adequate detail to convince the reader of the team's ability to accomplish specific tasks and achieve the study's goals. |
| Rating | excellent |

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

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| Comments | Documentation is good and evidence of past successes by team elements in related studies indicates a high degree of feasibility in the intended work. Various labs and personnel are already accomplished at the same or similar tasks to be undertaken in the proposed work. Scaling is adequate given the budget and personnel. |
| Rating | excellent |

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

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| Comments | This study will improve future monitoring, but is not a monitoring study. It will develop key information |
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Technical Review #2

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| | for use by managers and monitoring teams. All experiments appear to have adequate controls incorporated into designs. |
| Rating | excellent |

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

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| Comments | I expect several publishable manuscripts of high quality, and a wealth of new information on delta smelt to managers. Experiments should have clear outcomes and be useful for management and improving our overall understanding, via an IBM Delta smelt model. |
| Rating | excellent |

Additional Comments

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| Comments | This is the only really good CALFED proposal that I have had the opportunity to review. It should be ranked highly and funded at the requested level if possible. |
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Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

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| Comments | The PI and Co-PIs have great track records in their areas of expertise. The team has sufficient breadth and is supported by a great deal of additional expertise/infrastructure in the region. Project collaborators/Co-PIs are members of agencies and academic units intimately involved in research on and conservation of Delta smelt. |
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Technical Review #2

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| Rating | excellent |
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Budget

Is the budget reasonable and adequate for the work proposed?

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| Comments | The budget seems appropriate and adequate to permit the tasks to be accomplished. |
| Rating | excellent |

Overall

Provide a brief explanation of your summary rating.

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|-----------------|---|
| Comments | The PI has assembled a team of highly accomplished and dedicated experts to address key questions. Background and justification material indicates a superior understanding of the important issues. |
| Rating | excellent |

Technical Review #3

proposal title: Assessing the Effects of Entrainment Risk, Reproductive Biology, Larval Feeding and Population Structure on Delta Smelt Recovery

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

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| Comments | The goals are fine. Delta smelt is a threatened species whose population stability may be compromised by human actions, primarily manipulating and diverting water in the Delta. Goals that address increasing fundamental knowledge about larval losses to entrainment, larval ecology and feeding that relate to understanding survival potential and its variability relative to prey abundance and availability, and population structure/reproductive patterns and peculiarities all address issues where increased knowledge could help to conserve Delta smelt. Unfortunately, the goals are not carried forward or incorporated into a focused, well-integrated proposal. The idea is timely and important. It is a complex, multifaceted idea that was not molded into a coherent package. |
| Rating | very good |

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

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| Comments | A reasonably good justification is provided to support the need for the components of the proposed research. |
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Technical Review #3

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| | The conceptual model provides information on how the particular elements of the proposed research are related. The complexity of the conceptual model indicates the need for a well-coordinated program, which is not achieved, in my opinion, in the proposal. It also suggests the need for a strong modeling component in the research to integrate the individual elements of the research, but such a component is lacking. |
| Rating | good |

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

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| Comments | Each of the elements alone could constitute a major piece of research to answer questions about Delta smelt ecology or susceptibility to entrainment loss. The approach is not well planned or designed, or described for that matter. I could not see how the individual elements would come together or even see how the P.I.s of the various elements would work together to achieve an integrated project. Results in each individual element may contribute to the knowledge base on Delta smelt. Methodologies are mostly standard or applied previously. If the larval supply, entrainment losses, population size components were successfully achieved, decision makers might find such information immediately useful. |
| Rating | fair |

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?
Is the scale of the project consistent with the objectives and within the grasp of authors?

Technical Review #3

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| Comments | <p>The lack of integration and poor planning of the proposal once again left me unconvinced that the project had high feasibility of success.</p> <p>In the case of the mark-recapture components, do the P.I.s know that alizarin and calcein have not been approved for use by FDA for field releases in which the marked fish or their predators might get into the human food chain? Oxytetracycline can be approved, but for a field release of OTC marked fish, special permission is required from FDA for each release trial. There have been field experiments in the past with alizarin, both overseas and in the USA, but those in the USA were found to be not in accord with FDA guidelines.</p> <p>I was unable to judge how feasible some of the elements were because of poor or incomplete descriptions of methodology. The mark-recapture experiments are a good example. No information on estimators, variances, or means quantify and parameterize statistical models or estimators was provided. The same is true for other components.</p> <p>The larval feeding experiments seem to take a step beyond what has been done previously in the laboratory with delta smelt larvae, but the P.I.s apparently plan to do nothing in the field to test statistical models they will develop on effects of prey level, turbulence and salinity. The turbulence factor, though popular in the larval ecology literature at the moment, may be of secondary importance in the Delta. What do delta smelt eat? How much? Model it, whatever. I think that the larval feeding component needs a coordinated field and lab approach. As it stands, the research</p> |
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| | <p>will do yet another lab experiment on larval delta smelt feeding (on rotifers in green water). The reproductive biology component. Some of it is interesting but it may be partly peripheral to the issue at hand- -i.e., loss of small delta smelt to the Delta water system. Some of it is relevant, i.e., documenting times and places of major spawns and possibly environmental factors associated with spawning. The mating strategies, spawning frequency, hybridization work, etc., interesting as these components are, may be peripheral.</p> <p>The population structure component. This element could be important. I don't have the expertise to judge many of the approaches that are described. I was disappointed that the element was not meshed with other elements (not the sole fault of this element. It seems that the P.I.s never got together to plan the integration of their respective elements).</p> <p>A modeling component that addresses integration and assures synthesis and quantification across the linkages shown in the conceptual model would be helpful in my opinion.</p> |
| Rating | fair |

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

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| Comments | This is not a monitoring proposal. |
| Rating | very good |

Technical Review #3

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

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| Comments | Lots of papers and presentations are promised, the intellectual evidence of success. Most of the products of this proposed research will be increases in knowledge that hopefully can be applied to management problems with delta smelt. As stated above, I have some doubts and concerns. |
| Rating | good |

Additional Comments

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| Comments | Each of the major tasks of this proposal could stand alone. The conceptual model shows how the tasks (elements) might be linked but there is little evidence that the P.I.s tried to do this. Instead, a very broad and unfocused project is proposed that tries to address a suite of issues related to delta smelt issues. Because the species is threatened, one could argue that these projects need to be implemented immediately. I would opt for better proposals and better plans that I think are more likely to provide the kinds of information that can help to save threatened delta smelt. |
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Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

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| Comments | Many of the individual P.I.s have fine credentials. The secondary personnel and support scientists also have experiences and skills that are appropriate. I couldn't really judge whether the levels of staffing |
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Technical Review #3

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| | were adequate or whether there were too many people involved. Can this team "efficiently and effectively implement the proposed project?" I have some concerns, based not on their individual qualifications, but based on the poorly planned proposal. The infrastructures of the three principal agencies/institutions involved in the proposal seem fully able to support the research teams. |
| Rating | very good |

Budget

Is the budget reasonable and adequate for the work proposed?

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| Comments | It is too complex, with too many components and people for me to feel highly confident in judging the budget. My sense was that several more or less independent projects were packaged in one proposal. If planned well, one might expect certain efficiencies and cost savings to result from the aggregation, But, when I looked at the budgets, I could not ascertain if this were the case. Some elements of the budget, e.g., Supplies and some instruments, etc., seemed to be redundant to me. For example lab supplies for culture of delta smelt showed up repeatedly in budgets- -to a total of approx \$37,000 for the two-year project. Seems high to me. |
| Rating | fair |

Overall

Provide a brief explanation of your summary rating.

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| Comments | A poorly integrated project. Some excellent P.I.s but no evidence of a strongly coordinated effort for this complex project. I have little confidence that the |
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Technical Review #3

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| | project will succeed, although I expect that some individual successes would emerge. This project needs some glue, possibly in the form of a modeling component, that can hold it together. Or, perhaps individual projects on the issues at hand that further threaten delta smelt would be a better approach. |
| Rating | fair |